



CAPE COD COMMISSION

DISTRICT OF CRITICAL PLANNING CONCERN NOMINATION

AUGUST 4, 2005

IMPORTANT NOTE: Nominating parties must call the Cape Cod Commission office to schedule a pre-application conference with Cape Cod Commission staff before submitting a District of Critical Planning Concern (DCPC) nomination form.

Directions:

1. Please answer all questions as completely and concisely as possible. Attach additional sheets if necessary.
  
2. The following attachments must be submitted to the Cape Cod Commission office with this application form. Each item will be discussed with Commission staff at the pre-application conference:
  - (a) A locus map consisting of one original section of the most recent U.S.G.S. 1:25,000--scale topographic map(s) containing the proposed district with proposed boundaries clearly shown.  
See Map #1.

- (b) Copies of all town assessors maps/sheets showing property within the proposed district.

Not needed per Cape Cod Commission Staff.

- (c) Copies of all town zoning maps showing property within the proposed district.

See Map #2.

- (d) Copies of all current municipal bylaws and regulations applicable within the proposed district.

See Volume #1, Appendix #1, Subdivision Rules & Regulations

See Volume #1, Appendix #2, Zoning By-Laws

See Volume #1, Appendix #3, General By-Laws

See Volume #1, Appendix #4, Board of Health Regulations

See Volume #1, Appendix #5, Conservation Commission Regulations

See Volume #1, Appendix #6, Planning Board Special Permit Regulations.

- (e) Provide documentation of community concern about the area (e.g., letters, newspaper articles, minutes of meetings, board resolutions).

See Volume #3, Appendix #9

(f) If the nomination concerns land located in more than one town have you consulted with appropriate municipal agencies in those towns before this application? Have you notified the boards of selectmen before submitting this application? If so, please attach a copy of such notification or correspondence.

This nomination covers the Town of Mashpee only.

(g) Provide studies or reports addressing the need for this district.

See Volume #2, Appendix #9, Page 18

See Volume #2, Appendix #10

See Volume #2, Appendix #11

See Volume #2, Appendix #12

See Volume #2, Appendix #13

See Volume #2, Appendix #14

See Volume #3, Appendix #17

See Volume #4, Appendix #21

Municipal Agencies only:

(h) Attach selectmens' comments on the proposed nomination if the nomination is being made by a planning board, board of health, historic commission, or conservation commission. See Volume 3, Appendix #20 for Mashpee Board of Selectmen comments.

The Cape Cod Commission reserves the right to request additional information from the applicant pertaining to a proposed DCPC designation at any time. The Cape Cod Commission reserves the right to reject incomplete applications without prejudice.

District of Critical Planning Concern Nomination Form  
General Information

1. Nominating entities:

Name/Organization: Town of Mashpee Planning Board  
Contact Person: Beverly Kane, Chair  
Town of Mashpee Conservation Commission  
Contact Person: Jack Fitzsimmons, Chair

Address: 16 Great Neck Road North, Mashpee, Ma. 02649  
Telephone: Planning Department: 1-508-539-1400 Ext. 520

2. Describe the location of the proposed district, including the affected town(s) and references to any distinguishing landmarks such as structures and roads that may act as boundary limits to the proposed district. If appropriate, give measurements in feet. The boundaries should be delineated as accurately as possible, both on the attached maps and in the narrative below.

The location of the proposed "Water Resource District" is the entire Town of Mashpee.

3. Does the proposed district include land located in more than one town? If yes, please indicate if this application relates to another application for the same district or purpose. (Applicants are encouraged to file joint applications for nominations that include more than one town.)

The proposed district does not include land in more than one town.

4. Approximate area of the proposed district:

Town of Mashpee: Total area 28.86 sq. miles, (18,470 acres), excluding that portion of Vineyard/Nantucket Sounds that lies within Mashpee's legal boundaries.  
Land area = 23.27 sq. miles, (14,894 acres)  
Estuarine waters = 3.24 sq. miles, (2,072 acres)  
Fresh water ponds = 2.35 sq. miles, (1,503 acres)

5. Identify existing local regulations that apply to development within the proposed district (include zoning and general by-laws, overlay districts (e.g., water resource protection districts), health regulations, and local historic districts). Cite the pertinent sections of those regulations or by-laws and attach a copy of each.

See Volume 1, Appendix #'s 1 through 6 for copies of local Regulations.

6. Are any local subdivision or development permits pending in this area?

There are many permit requests pending before Mashpee boards and Commissions seeking to develop property throughout the town of Mashpee. They are too numerous to list.

7. Are you aware of any local organizations that have jurisdiction over property within the proposed district (e.g., private conservation trusts)? If yes, please describe.

See Map #3.

8. Are there any state, federal, or county landholdings within the proposed district? If yes, please describe.

See Map #4.

9. Are any technical studies or management plans proposed, ongoing, or completed relating to the proposed district? If yes, please cite.

Watershed Nitrogen Management Plan / Effluent Pipeline Preliminary Design b)

Wastewater disposal impacts:~As reported in the comprehensive 138-page

"Massachusetts Estuaries Report:~ Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Popponeset Bay, Mashpee and Barnstable, Massachusetts", September 2004:

Page 1, last paragraph:~ "The primary ecological threat to Popponeset Bay embayment system as a coastal resource is degradation resulting from nutrient enrichment.~ .....loading of the critical eutrophying nutrient, nitrogen, to the Bay waters has been greatly increased over the past few decades with further increases certain unless nitrogen management is implemented.~ The nitrogen loading to the Bay, like almost all embayments in southeastern Massachusetts, results primarily from on-site disposal of wastewater.~ The Town of Mashpee has been among the fastest growing towns in the Commonwealth over the past two decades and does not have centralized wastewater treatment.....As existing and probably increasing levels of nutrients impact Mashpee's coastal embayments, water quality degradation will accelerate, with further harm to invaluable environmental resources."

a) Degradation of our water resources has resulted in negative impacts on the ability of our natural resources to provide quality boating, swimming, fishing and shellfishing opportunities. [needs more? Something on the effect on the natural resources themselves?]

Mashpee Sewer Commission with the assistance of a \$405,140 loan from the Massachusetts Water Pollution Abatement Trust's State Revolving Fund (SRF) program. The engineering firm of Stearns & Wheler, LLC and the University of Massachusetts - Dartmouth, School of Marine Science & Technology (SMAST) have been contracted to develop the plan.

The primary focus of the plan is the removal of nitrogen from the watersheds of the Popponeset and Waquoit Bay estuarine systems by the most cost-effective means available. The study area includes the entire town of Mashpee as well as those portions of Barnstable, Sandwich and Falmouth located in the watersheds of Popponeset Bay, the Quashnet River or Hamblin Pond. The tasks to be undertaken are similar to the initial tasks of a traditional wastewater planning study following Mass. DEP requirements, as described in 310 CMR 41.00 and the Guide to Comprehensive Wastewater Management Planning, but the emphasis is nitrate nitrogen **or** loadings rather than failed septic systems, sewers that are over capacity, non-functioning treatment plants or pump stations.

The project also includes a more detailed effluent pipeline and disposal area preliminary design study. The concept to be developed involves collection of treated effluent from a number of existing and proposed wastewater treatment facilities in the central area of the town and transmission via pipeline to a discharge site that lies outside the watersheds of nitrogen-sensitive coastal embayments.

The Plan is intended to address facilities and management options, to include development of a municipal sewer system, possibly based on existing private systems, cluster and innovative / alternative on-site facilities and facility management approaches, along with stormwater facilities and management and other traditional or innovative approaches to nitrogen reduction or removal. It is also expected to include conceptual facilities designs, estimated costs, financing mechanisms, pricing / charges, regulatory changes and other items relevant to the establishment of a municipal sewer system and management of nitrogen loading to the watersheds. The

effluent pipeline design study will address facility types, routing and facility sizing, appropriate discharge locations, preliminary designs and cost estimates sufficient for establishing the amount of funds to be sought from Town Meeting to design and construct the pipeline and discharge area and purchase any necessary lands, and suggested management approaches, financing mechanisms, pricing / charges, regulatory changes and other items relevant to the establishment of a municipal effluent collection and disposal facility.

Review of the plan is required under MEPA, which means the plan will also require approval as a DRI by the Cape Cod Commission. A formal MEPA Scoping Session / Public Hearing regarding the Plan and ENF was held on Tuesday, October 16, 1991. Based on comments at that meeting and on written comments submitted to the state, the Secretary of Environmental Affairs issued his decision certificate on November 9, 2001. Portions of the project were completed in 2001-2002, with the remainder suspended until the completion of the Mass. Estuaries Project's Popponeset Bay and Quashnet River / Hamblin Pond / Jehu Pond nitrogen loading studies and TMDL reports. The Stearns & Wheler contract is currently being re-scoped with re-start of the project anticipated this summer and completion in 12-18 months (including MEPA and DRI review).

#### Sewer System Evaluation of Popponeset Bay Watershed.

Mashpee Sewer Commission with the assistance of a \$33,000 grant from Barnstable County. The engineering firm of Stearns & Wheler, LLC has been contracted to conduct the study.

This project will evaluate the use of various sewer collection systems and model their application to the Popponesett watershed to arrive at cost-effective alternatives for areas of flat topography and shallow depths to groundwater and seasonal flows. The following tasks detail the Project Scope:

Identify and screen sewer system technologies that would be appropriate for this portion of Cape Cod including: 1) gravity collection system with lift station(s), 2) low pressure grinder pump collection system(s), 3) vacuum collection system and 4) septic tank effluent pump (STEP) systems.

Develop a model of the portions of the Popponesett Watershed where sewerage and advanced wastewater treatment is required to meet the Massachusetts Estuaries' Project (MEP) nitrogen limits. The model will be developed to identify preliminary design information such as lift station location, approximate sewer depths, and capital and O&M costs. It will use Sewer CAD<sup>®</sup> programming output, as well as vacuum sewer and low-pressure sewer programming output provided by suppliers of those systems.

The following sewer scenarios are expected to be modeled for the required sewer system coverage area: 1) all gravity collection system with the needed lift stations, 2) all low-pressure grinder pump system with the needed lift stations, 3) all vacuum sewer system with the needed vacuum and lift stations and 4) combination of gravity, low-pressure and vacuum systems.

Model output will include: 1) sewer pipe size and material, 2) sewer depth, 3) lift and vacuum station locations, 4) capital and O&M costs and 4) drawings illustrating collection piping and lift station location and sizing.

The project report will include: 1) identification and screening of technologies, 2) technology description, 3) summary of advantages and disadvantages, 4) tabular summary of the main characteristics of the technologies, 5) recommendations of which technology to consider further, 6) proposed sewer system coverage based on MEP

findings of where to mitigate nitrogen, and the Town goals for municipal wastewater facilities, 7) a summary of the evaluations and decisions to sewer specific areas of the watershed, 8) sewer model development and model output, 9) discussions of groundwater modeling of effluent discharges by USGS and 10) a final report and presentation of the findings to the County Wastewater Implementation Committee, including a demonstration of the Sewer CAD<sup>®</sup> model.

Due to the manner in which Mass. Estuaries Program wastewater flows were reported, the Town and Stearns & Wheler have also had to re-create buildout wastewater projections for parcels in the watershed. This delayed the project but has now been completed as have technology screening and model development. The final project report and presentation are expected in June or July, 2005.

#### U. S. Geological Survey Modeling of Potential Wastewater Discharge Locations.

The U. S. Geological Survey (USGS) is under contract to Barnstable County, through the Cape Cod Commission, for a project entitled "Hydrologic Analysis of Wastewater and Public Supply Alternatives". The primary objective of the project is to provide groundwater modeling scenarios for the hydrologic analysis of town-specific wastewater discharge alternatives. The Mashpee Sewer Commission has taken advantage of the program to obtain modeling of groundwater discharge from a series of potential wastewater discharge facilities. The Sewer Commission also contracted with the engineering firm of Stearns & Wheler, LLC to provide engineering data on potential sites, coordination with USGS and review of project results.

The Town selected 15 potential discharge locations for initial review by Stearns & Wheler, who then generated potential discharge area layouts and potential maximum discharge rates for each site. Seven sites were then chosen for modeling by USGS as part of 10 modeling scenarios involving various combinations of sites, ranging from existing conditions to 3 million gallons per day of new effluent discharge, taking into account new public water supply withdrawals projected for 2020 by the Mashpee Water District.

USGS generated draft particle tracking modeling results in February, 2005 demonstrating the hydrologic effect of potential disposal scenarios on local surface water resources, the potential for adverse effects on existing and proposed water supplies and the effect of changing heads and gradients on contributing areas to streams, ponds and estuaries. The modeling results indicated that a number of the proposed sites would be unacceptable, pointing out the severely limited set of disposal options available to the Town.

More refined final modeling on the 10 scenarios is scheduled to be delivered during summer 2005. Additional modeling scenarios may be developed later in 2005.

#### Massachusetts Estuaries Project

The DEP Massachusetts Estuaries Project (MEP) has delivered a final "Linked Watershed - Embayment Model" report regarding nitrogen loading in the Popponesset Bay watershed, which is located primarily in Mashpee, but also includes portions of Barnstable and Sandwich. A draft report for the Quashnet River, Hamblin Pond and Jehu Pond, whose watersheds make up part of the larger Waquoit Bay watershed, has also been completed.

The Quashnet River watershed lies primarily in Mashpee, but also includes small portions of Falmouth and Sandwich. A portion of the Hamblin Pond watershed also lies

in Falmouth, with the majority in Mashpee. The Jehu Pond watershed lies entirely in Mashpee.

DEP has also generated draft TMDL (Total Maximum Daily Load) reports for both watersheds, indicating target nitrogen loading to sustain or restore water quality and ecological health in the subject embayments, under guidelines established by the U. S. Environmental Protection Agency.

The MEP models and TMDL reports will be the basis for further wastewater facilities planning and regulatory efforts undertaken by the Town and DEP.

#### DEP Popponesset Bay Pilot Project.

DEP has received a grant from EPA for a project entitled "Protecting Coastal Waters through Watershed-Wide Permitting and Nutrient Trading in Three Massachusetts Estuaries". The purpose of the grant is to evaluate innovative nitrogen reduction efforts by three pilot Massachusetts Estuaries Project (MEP) communities and examine the regulatory and permitting issues raised by these efforts. The project is intended to produce a case study for each pilot community and a road map to address the regulatory and permitting issues relating to watershed-based permitting and nutrient trading.

Popponesset Bay was one of the three case studies selected for the project. Beginning in October 2003, DEP and representatives of the Towns of Mashpee, Barnstable and Sandwich, with assistance from the Cape Cod Commission and UMass Dartmouth School of Marine Science and Technology, have been meeting to address the project's objectives, which include 1) review of the MEP technical reports and TMDLs, 2) development of alternate nitrogen reduction scenarios to be evaluated through additional MEP modeling, 3) providing local perspective on regulatory issues raised in the project, 4) incorporating alternate scenarios into nutrient management and facilities planning, where appropriate, and 5) providing outreach to the local community on results of case studies and interaction with other case study communities on nitrogen reduction issues of mutual interest.

The project meetings have also provided a forum for interaction between the three towns and DEP regarding both potential state and local regulatory approaches to nitrogen management in the watershed and establishment of a "fair share" of responsibility for nitrogen reductions between the towns. The project is expected to continue over the next year and be completed by December, 2006.

Purpose of Proposed Nomination

Criteria:

The Cape Cod Commission Act provides for designation of certain areas that must be preserved and maintained due to one or more of the following factors:

- C1. the presence of significant natural, coastal, scientific, cultural, architectural, archaeological, historic, economic, or recreational resources or values of regional, statewide, or national significance; or
- C2. the presence of substantial areas of sensitive ecological conditions that render the area unsuitable for development; or
- C3. the presence or proposed establishment of a major capital public facility or area of public investment.

10. Indicate the type of district(s) that is (are) proposed. The Commission has identified certain types of districts that may be nominated as DCPCs; types of districts not listed may also be nominated. For a description of each type of district listed, see Appendix A. Check all that apply:

- Water Resource District
- Aquaculture Resource District
- Agricultural Resource District
- Wildlife, Natural, Scientific, or Ecological Resource District
- Cultural, Historic, Architectural, or Archaeological Resource District
- Economic or Development Resource District
- Affordable Housing Resource District
- Major Public Investment District
- Hazard District
- Waterfront Management/Watersheet Zoning District
- Downtown Commercial Revitalization District
- Transportation Management District
- Other

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Nomination Form, Item #10: Page 10, last paragraph:~  
"Unfortunately, almost all of the estuarine reaches within the Popponesset Bay System (including Popponesset Bay) are near or beyond their ability to assimilate additional nutrients without impacting their ecological health.~  
Indicate the type of district (s) that is (are) proposed. The Commission has identified certain types of districts that may be nominated as DCPC's; types of districts not listed may also be nominated.

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d) The high incidence of commercial development concentrated within the Mashpee rotary area and private development in the surrounding area has created a public attraction by use and dependence on private automobile travel into a concentrated complex of commercial enterprises.~ This, along with traffic increases Cape-wide and the volume of "commuter" traffic in the rotary area, has created traffic congestion and delays in movement into and around the heart and core of Mashpee. It has impacted public safety, quality, and resulted in a negative affect on the quality of community life.~ We believe that the town-wide "Water Resource District" DCPC designation is merited due to the following:

1) Under the Cape Cod Commission Act, e) Mashpee's growth has essentially reached 15,000, the desired year-round population cap of outlined in the Town's Local Comprehensive Plan. Current numbers indicate that our "build out" total will be significantly higher than those ten year old numbers, as year round occupancy has been higher than predictSection 10 (a), C1:

"The presence of significant natural, coastal, cultural, archaeological, historic, economic, and recreational resources or values of regional, statewide, or national significance".

2) Suggested criteria listed in the Cape Cod Commission District of Critical Planning Concern, Appendix A:

(1), "Water Resource District".....is important to the protection of an aquifer, watershed, aquifer recharge zone, or surface water body, with the following considerations:

(i) Without special regulations in the district, development or waste disposal could endanger the quality or quantity of water.

(ii) Studies or expert advice indicate that the designation and regulation of the district could be effective in protecting the quality or quantity of water.

#### Supporting Facts:

Mashpee's sole source of drinking water is supplied by sub-surface groundwater in the area known as the Sagamore Lens. The groundwater in the Sagamore Lens is also of regional importance because it supplies drinking water to the towns of Sandwich, Falmouth, Barnstable and portions of Bourne and Yarmouth as well. The water resources of the Sagamore Lens include wellhead protection areas, private wells, freshwater recharge areas, marine recharge areas, and future supply wells. Each public supply well in the Sagamore Lens is fed by groundwater from a defined recharge area, also referred to as a Zone II or wellhead protection area. (See Volume 2, Appendix #7, "Sagamore Lens: Focus on Groundwater Protection".)

The Federal Clean Water Act requires all states to identify waterbodies that do not meet state standards and to develop "Total Maximum Daily Loads" (TMDLs) for them. TMDL stands for Total Maximum Daily Load and is a calculation of the maximum amount of a pollutant from all contributing point and non-point sources that a waterbody can accept and still meet the state's Water Quality Standards for public health and healthy ecosystems. Point sources are primarily wastewater treatment plants that discharge to surface waters or groundwater. Non-point sources include septic systems, stormwater discharges via runoff over the land surface, and fertilizer runoff from lawns and golf courses. The nutrient causing the degradation of salt water embayment

systems is nitrogen, while excess phosphorus from land-based activities degrades the health of fresh water bodies.

Massachusetts sets statewide Water Quality Standards for a variety of uses such as drinking water supplies, fishing, recreational swimming and boating, and healthy ecosystems for plants and animals. The State maintains and publishes a listing of the conditions of Massachusetts' waters pursuant to Sections 303(d) and 305(b) of the Federal Clean Water Act entitled "Massachusetts 2004 Integrated List of Waters". (See Volume #3, Appendix #17)

In recognition of the problems caused by excess nutrient loading in the 89 estuaries in southeastern Massachusetts, The Massachusetts Department of Environmental Protection (D.E.P.) initiated a program called "The Massachusetts Estuary Project (M.E.P.). The goal of this program is to determine which estuaries are being impacted by excessive nutrients and to identify their sources. This data will provide communities with the scientific basis for how to protect and restore their estuaries.

The technical report is prepared and issued by SMAST, the School for Marine Science and Technology at U-Mass Dartmouth. From that report, the D.E.P. then prepares a draft "Total Maximum Daily Load" (TMDL) report approximately 30-60 days after the final Technical Report is completed.

In the future, state (DEP) and federal mandates will require communities to address water quality impairments created by nitrogen and phosphorus loading, and to provide protection and restoration of the health of its estuaries.

The Town of Mashpee lies almost entirely within two shallow coastal embayment systems, Popponesset Bay and Waquoit Bay, that ultimately drain to Nantucket Sound.

(Reference: Map # 6, Mashpee Watershed Map) A small portion of the town located in the southeastern section drains directly into Nantucket Sound.

Mashpee's surface water resources are located in every section of the town, with coastal water resources situated along the southern border of the town. The town's namesake Mashpee River, located in the Popponesset Bay Watershed, flows north to south through the mid-section of the town from its source at the southwest shore of Mashpee/Wakeby Pond in the northern section of Mashpee. The river eventually finds its way into Nantucket Sound via Popponesset Bay. (See Volume #2, Appendix #8 which contains narrative descriptions of our ecosystems.)

In September, 2004, M.E.P. issued its technical report for Popponesset Bay entitled "Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Popponesset Bay, Mashpee and Barnstable, Massachusetts". See Page 2 and Page 19 of this report (Volume #2, Appendix #11) for a map of the study region, and the watershed and subwatershed delineations for the Popponesset Bay Estuary System. This estuary system does not follow political boundaries. The northern-most portion of it is located in the town of Sandwich, and an eastern portion in the town of Barnstable.

Although the town of Mashpee is the main stakeholder for this estuary system, We recognize that Sandwich and Barnstable should be included in the decision-making process for this shared resource, and we will pursue MOU's and MOA's with our neighbor towns.

We quote the following from this report:

*"The estuaries region of the Popponesset Bay System is composed of a large lower basin, Popponesset Bay, and multiple tributary sub-embayments (Ockway Bay,*

Pinquickset Cove, Shoestring Bay, Mashpee River, Popponesset Creek). These sub-embayments constitute important components of the Town's natural and cultural resources. In addition, the large number of sub-embayments greatly increases the System's shoreline and decreases the travel time of groundwater from the watershed recharge areas to bay regions of discharge. The nature of enclosed embayments in populous regions brings two opposing elements to bear; as protected marine shoreline they are popular regions for boating, recreation, and land development; as enclosed bodies of water they may not be readily flushed of the pollutants that they receive due to the proximity and density of development near and along their shores. (Volume #2, Appendix #11, Page 1, M.E.P. Report)

"Land uses closest to the embayment are likely to have greater impact than those in the upper portions of the watershed which are subject to nitrogen attenuation during transport through natural aquatic systems (e.g. ponds, rivers, wetlands, etc.) prior to discharge to the embayment." Volume #2, Appendix #11, (Page 1, M.E.P. report)

"As the primary stakeholder to the Popponesset Bay System, the Town of Mashpee was the first community to become concerned over perceived degradation of Bay waters. (Volume #2, Appendix #11, Page 3, M.E.P. report)

"The primary ecological threat to Popponesset Bay embayment system as a coastal resource is degradation resulting from nutrient enrichment." (Page 1, M.E.P. Report)...The primary nutrient causing the increasing impairment of the Commonwealth's coastal embayments is nitrogen and the primary sources of this nitrogen are wastewater disposal, fertilizers, and changes in the freshwater hydrology associated with development"....."result is the loss of fisheries habitat, eelgrass beds.... (Volume #2, Appendix #11, Page 4, M.E.P. report)

"The Town of Mashpee has been among the fastest growing towns in the Commonwealth over the past two decades.....the nitrogen loading to the Bay results primarily from on-site disposal of wastewater.....As existing and probable increasing levels of nutrients impact Mashpee's coastal embayments, water quality degradation will accelerate, with further harm to invaluable environmental resources". (Volume #2, Appendix #11, Page 3, M.E.P. report)

The "Massachusetts 2004 Integrated List of Waters" includes the following impaired waters located in the Popponesset Bay system that are listed under "Massachusetts Category 5 Waters: Waters requiring a TMDL": Popponesset Bay (nutrients), The Mashpee River (Nutrients), Santuit Pond (nutrients), Shoestring Bay (nutrients). (See Volume #3, Appendix #17)

NOTE: The Town of Mashpee is facing substantial additional development with accompanying increasing levels of nutrient loading. Refer to Map #5, Town of Mashpee "Developments Permitted or Proposed".

The largest source of freshwater to Waquoit Bay, shared with the town of Falmouth, is the Quashnet/Moonakis River which originates in Johns Pond in Mashpee and traverses forests, cranberry bogs, residential areas and the Quashnet Valley Golf Club before joining the Bay near its head. The Childs River, which also originates in Johns Pond, is the second largest source of freshwater to Waquoit Bay. Many diverse waters connect to this Bay: Hamblin and Jehu Ponds, brackish ponds via Little and Great Rivers; Sage Lot Pond and Flat Pond, brackish waters connected to each other and to the Bay via sections of the Quashnet/Moonakis River. (Reference: Volume #4, Appendix #21, "The Ecology of Waquoit Bay", page I-1, Margaret Geist, Editor).

The impacts from excess nitrogen loading to the Waquoit Bay estuarine complex (loss of eelgrass, decreased water clarity, overgrowth of phytoplankton and seaweeds at the expense of seagrasses, decreased oxygen in bottom waters, increasing incidence of fish kills, algae blooms and unpleasant odors) have been well documented in numerous past studies and reports.

References: Volume #4, Appendix #21, "The Ecology of Waquoit Bay", Page VI, Margaret Geist, Editor, and Volume 2, Appendix 10, "Cape Cod Watershed Assessment and Action Plan, Massachusetts Watershed Initiative, MA Executive Office of Environmental Affairs, Final Draft-February, 2003"

The Quashnet River/Hamblin Pond/ Jehu Pond systems, (portions of the Waquoit Bay estuary system), were selected as a priority area for determination of critical nutrient loading thresholds by the Massachusetts Estuaries Project. The draft report for these water systems has been prepared and will soon be released to the public.

The State of Massachusetts lists Waquoit Bay, John's Pond, Ashumet Pond, the Quashnet River, Hamblin Pond and Jehu Pond as "Category 5 Waters: Waters Requiring a TMDL".

Healthy surface, sub-surface, and coastal water resources are the life blood of our community and critical to its economic well-being. Because of the interconnection between fresh water and marine water, all uses of water, whether for drinking, swimming, boating, fishing, shellfishing, cranberry farming, or wetland habitat, are dependent upon the quality of the groundwater. We must control, reduce, and monitor phosphorus and nitrogen loading to our groundwater and surface water bodies.

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Nomination form, Item #12: Describe any problems associated with inappropriate development of the area.

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The Town of Mashpee has been among the fastest developing towns in the Commonwealth over the past several decades. An immediate negative impact from land clearing for development has produced a decrease in the ability of the land to naturally remediate nitrogen loading and thus the ability of the community to maintain long-term sustainability. Second, development places demands on water supplies and results in additional wastewater flow that produces additional nutrient loading to our groundwater and surface water bodies. Third, stormwater runoff from impervious surfaces is a major problem. The natural nutrient attenuation provided by vegetated areas is destroyed when we cover the land with buildings, roads, and parking lots.

The existing meadows and forests are replaced with roofs, concrete, and asphalt, all of which do not allow rain to penetrate the earth. Instead, the fallen rain quickly runs directly into storm drainage facilities, which discharge directly into the groundwater.

Today, both of our ecosystems, Popponesset Bay and Waquoit Bay, are listed on the state's list of impaired waters requiring a TMDL due to excessive nutrient loading.

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Nomination Form, Item #13: What would be gained through additional planning or regulatory control of this area?

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We believe that a cooperative effort among town boards and commissions, working under the structured and focused process that this DCPC provides, will result in establishing protective regulations and restoration measures for our groundwater and surface water resources.

Additional planning and/or regulatory controls that result from this DCPC process will provide reduction in the excessive nutrient loading to our embayment systems and restoration of our surface water bodies. We have listed proposed initiatives under Item 16 of this nomination form.

Scientific and technical data are now available to assist the town in moving forward on water quality problems. These include: DEP's "Embayment Restoration and Guidance for Implementation Strategies, 2003", (Volume #2, Appendix #13) MEP's "Linked Watershed Embayment Model to Determine Critical Nitrogen Loading Thresholds for Popponesset Bay", (Volume #2, Appendix #11), the MEP technical report on the Quashnet River/Hamblin Pond/Jehu Pond systems, and "Enhancing Wastewater Management on Cape Cod: Planning, Administrative and Legal Tools, Report to Barnstable County, July, 2004, Wright-Pierce, CLF Ventures, Teal, Ltd.", (Volume #2, Appendix #15)

DEP states that: "The challenge for coastal communities will be to determine which pathways are appropriate to their particular watersheds. Specific tasks will include assessing nutrient sources, developing an integrated approach to nutrient planning and management, and implementing a plan to avoid continued degradation of estuarine systems."

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Nomination form, Item #14:

What classes or types of proposed development should be allowed to continue during the consideration of the nomination because they will not be substantially detrimental to the area and the public health, safety, and general welfare, and will not compromise the purposes of the Act?

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When considering the classes and types of proposed development that should be exempt from the second moratorium period, we concluded that the following should be exempt.

We based this pragmatic decision on the nature and town-wide extent of this DCPC, the amount of development already exempt from inclusion by the Cape Cod Commission Act, and the remaining developable land. Halting most or all remaining development during the second moratorium period would present a serious economic hardship on local individuals and small businesses. We believe allowing these exemptions during the second moratorium period would be modest in relation to the long-term benefit to be derived from focusing on the protection of our water resources. Further, these exemptions are necessary to ensure support for the town-wide "Water Resource District of Critical Planning Concern" and its subsequent implementing regulations.

1. Single-family houses and accessory structures on existing lots.
2. Repair and maintenance of existing structures.
3. Upgrade, change, alteration, or extension of a single or multi-family dwelling or an accessory structure.
4. Permits issued under the jurisdiction of the Board of Health.
5. Permits issued under the jurisdiction of the Conservation Commission.
6. Licenses and permits authorized by the Board of Selectmen.
7. Development projects by non-profit entities.
8. Accessory apartments allowed under Mashpee Zoning By-Law Section 174-45.4.
9. New construction or expansion of non-residential structures, provided that such construction or expansion shall not result in new Title 5 wastewater flow greater than 600 gallons per day.
10. Cluster subdivisions with a density of not greater than one (1) building lot per 2 acres under Section 174-47 of the Mashpee Zoning By-Laws and Open Space Incentive Development (OSID) projects under Section 174-46 of the Mashpee Zoning By-Laws.
11. Modifications of previously-approved subdivisions which do not increase the number of building lots.

12. Modifications of previously-approved special permits which do not increase the number of residential units, and which do not increase non-residential square footage (except as provided by "#9" above and except for non-habitable accessory or utility structures).
13. Subdivision roadway design plans and modification plans that, in the opinion of the Mashpee Planning Board, will not compromise the purposes of this DCPC nomination.
14. Docks and other structures regulated under the Mashpee Zoning By-Laws, Section 174-25, I-9.

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Nomination Form, Item #15: What type (s) of development would be appropriate within the proposed district after the district has been nominated?

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Development should be guided by consideration of water-quality-associated impacts in the particular sub-watershed that the development is proposed. The over-riding concern when considering additional development should be whether or not the sub-watershed can safely assimilate the amounts of nutrient loading involved without causing further negative impacts to groundwater and water bodies.

For example, in its report on the Popponesset Bay Watershed area, MEP states that, "Unfortunately, almost all of the estuarine reaches within the Popponesset Bay System (including Popponesset Bay itself) are near or beyond their ability to assimilate additional nutrients without impacting their ecological health. Therefore, proposed development in this particular area must not produce additional nutrient loading that the estuary system is unable to assimilate without causing further damaging impacts to its health.

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Nomination Form, Item #16: What guidelines for development should be instituted in the proposed district to protect the values and purposes for which the district is being nominated (e.g., local zoning and general by-laws, regulations, local overlay districts)?

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The goals of this DCPC are to develop an integrated approach to nutrient planning and management, to implement a plan to avoid continued degradation of estuarine systems, and to provide for the restoration of our impaired water bodies. The State has mandated remedial actions for impaired water bodies, stating that: "The challenge for coastal communities will be to determine which pathways are appropriate to their particular watersheds".

It is our intention to pursue all available options that will aid in achieving the goals we have set forth, i.e., through local zoning and general by-laws, overlay districts and/or other measures and regulations, including modification or adoption of the following:

- 1) Board of Health nitrogen regulations requiring denitrification for flows over 600 gallons per day.
- 2) Conservation Commission wetlands regulations requiring on-site denitrification systems.
- 3) Stormwater Management zoning by-law (Section 174-21.1)
- 4) Growth Management zoning by-law (Section 174-26) relative to development rate in relation to availability of adequate wastewater infrastructure and nutrient impacts.
- 5) Water Quality Report zoning by-law (Section 174-27) updated to reflect MEP embayment reports, TMDL's (Total Maximum Daily Loads) and new USGS recharge area modeling.
- 6) Mashpee River and Quashnet River Protective Districts zoning by-law (Section 174-69 to 75)
- 7) Groundwater Protection District zoning by-law (Sections 174-76 to 83) re: expansion to deal with nutrient loads to bays vs. only well recharge areas.
- 8) Incentives for nutrient mitigation in OSID, Cluster subdivision and Commercial Center by-laws.
- 9) Planning Board special permit and subdivision stormwater regulations and design standards.
- 10) Nitrogen loading TMDL "fair share" performance standard for new development and redevelopment.
- 11) Action items contained in the County's wastewater "Tools" report, "Enhancing Wastewater Management on Cape Cod: Planning, Administrative and Legal Tools" dated July, 2004 (Volume #2, Appendix #15) including, but not limited to:

Identification of nitrogen sensitive watersheds; establish program for escrow accounts; use of covenants to acknowledge interim solutions; mandate cluster system evaluation; require consistent engineering design basis; establish design & construction standards; coordination among Town Boards; develop priority ranking of sites considering disturbed sites first; incorporation of flexible wording on future land set-asides; pursue selective use of power line easements and road rights of way; promote innovative effluent disposal options; interface with the County's program to provide oversight of enhanced treatment systems.

- 12) Pursue Memorandums of Understanding (MOU's) and Memorandums of Agreement (MOA's) with neighboring towns who share the Popponesset Bay and Waquoit Bay Watersheds with the town of Mashpee re: regulatory and facilities responses to TMDL's established by DEP.

As soon as this nomination request is formally submitted, we will form a working group that will be responsible for implementing the tasks we have enumerated. This group will include representatives from Town boards and committees, community representatives, and neighbor towns' representatives.

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Nomination Form, Item #17: What other types of initiatives may be needed to implement the objectives of the proposed district (e.g., grants, design guidelines, studies?)

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1. Pursue grant opportunities to assist with the broad range of funding needed for water resource issues vital to our community's well-being, including a component to provide a town-wide educational outreach effort.
2. Develop plan for the permanent monitoring of our water resources to ensure on-going evaluation of the health of these resources.
3. Ensure timely reporting of wastewater treatment facilities' operating results, and provide for enforcement of local permit requirements with respect to nitrogen loading.
4. Wastewater Facilities Planning and Development.
5. Implementation of nutrient best management practices for stormwater facilities.
6. Pursue MOU's and MOA's with Sandwich, Barnstable and Falmouth who share the Waquoit Bay and Popponesset Bay watersheds with the town of Mashpee.

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Nomination Form, Item #18: Please list all supporting documentation submitted with this application that is not already listed on the cover sheet.

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Volume 2, Appendix 10

E.O.E.A. "Cape Cod Watershed  
Assessment and Action Plan,  
Final Draft, February, 2003

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Massachusetts Estuaries Report  
(M.E.P.) "Linked Watershed Model to  
Determine Critical Nitrogen Loading  
Thresholds for Popponeset  
Bay, Mashpee and Barnstable, Ma",  
September, 2004

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Draft, Popponeset Bay Total Maximum  
Daily Loads for Total Nitrogen,  
January 6, 2005

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The Massachusetts Estuaries Project  
  
Embayment Restoration and Guidance  
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Volume 2, Appendix 14

Cape Cod Comprehensive Regional  
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"Enhancing Wastewater Management on  
  
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Barnstable County, 2004,  
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Cape Cod Atlas of Tidally  
Restricted Salt Marshes,  
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The Ecology of Waquoit Bay,  
National Estuarine Research Reserve  
Margaret Geist, Editor, 1996

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